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Advancements

Cold In-Place Recycled Asphalt Tested on Low-Volume Routes in Northwest District

Business Issue

State DOT's across the country are facing the same pressures to do more with less and deliver more value for every tax dollar spent. With continually rising oil prices and the expense of prepping the road prior to an HMA overlay, the Northwest District sought out a cheaper way of rehabilitating these pavements. The alternative they chose was a Cold In-Place Recycled (CIR) Asphalt Overlay. This overlay uses existing material and is therefore more environmentally friendly and further reduces trucking costs for disposal and to bring new material on site. Also, the cost of maintenance operations to prepare the roadway prior to the contractor is reduced or eliminated with the CIR. Northwest District Area Engineer Marty Liles, Maintenance Superintendent Charles Roach and maintenance employees from the Albany and King City area, led the test project of CIR for the Northwest District.

Figure 1: Pavement rutting and Cracking, Route H, Gentry County

Approach

The objective of this project was to determine the feasibility of a Cold-In- Place Recycled (CIR) asphalt overlay as a viable alternative to rehabilitate Missouri's lower volume lettered routes. For this project, the Northwest District chose Routes E and H in Gentry County. Each of these routes carry less than 300 vehicles per day, are subject to the loads of heavy farm equipment and exhibit signs of high severity rutting and high severity cracking in both the longitudinal and transverse directions. (Figure 1) According to Liles these routes were selected because of their extremely poor condition. In July of 2008, the Northwest District contracted with SemMaterials and Brown and Brown, Inc. to put CIR asphalt to the test. The overlay project started on the morning of July 21, 2008 and was completed on August 25, 2008.

The CIR asphalt overlay project consisted of milling 3" of the asphalt surface on Route H and 2" from Route E, further crushing the recycled material, adding an asphalt emulsion to the reclaimed material and placing it in a paver to be laid on both roadways. A paving train was used (Figure 2) consisting of a milling machine, a crushing\screening machine, a pug mill mixer, a conventional hot mix paver, a pneumatic roller and a vibratory steel drum roller. Before the CIR operations began, the contractor removed dirt and debris from the pavement edge using a motor grader.

Approach *(cont'd.)*

Both routes were closed to all but local traffic during the project. However, traffic was allowed to proceed on the new overlay within two hours of roller compaction. After the CIR operations were completed, maintenance employees at the Albany and King City facilities applied a chip seal to both routes as a means of sealing the pavement surface. MoDOT also supplied traffic control throughout the CIR operations. Both of these services helped lower project costs. The cost for the 2" CIR (not including chip seal) was $29,045 per mile and the cost for the 3" CIR was $34,147.

Figure 2: CIR paving train

CIR Findings and Future Efforts

Approximately two weeks prior to the start of the project, Organizational Results employees set up 18 500-foot sections on the test routes. A visual distress survey and rut depth measurements were taken after the sections had been laid out. These sections also were marked for future reference and follow-up testing. Through visual observation by MoDOT employees, 100 percent of the surface cracks and pavement deterioration was removed during the milling operation. The preliminary density testing is complete with post construction measures scheduled to be taken in 2009.

Figure 3 – After CIR Treatment and Chip Seal, Route H, Gentry County

The CIR overlay has shown small areas of failure in various sections of the roadway. Project employees noted that this failure could be due to a lack of lime in the mixture, a lack of roadway preparation, oil content or the need for extra milling in the process. According to Liles, the Northwest District wants to try CIR again. The district is in the process of selecting some additional routes as CIR projects for spring of 2009. "I think this has the potential to provide a smoother surface for these low-volume routes that the public has been desperately wanting without requiring maintenance to spend a significant amount of money making improvements to the route before it can be resurfaced by the contractor," said Liles